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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/049,492	02/12/2002	Jun Sudo	G110-044 US	4081
21706	7590	10/18/2004	EXAMINER	
NOTARO AND MICHALOS 100 DUTCH HILL ROAD SUITE 110 ORANGEBURG, NY 10962-2100			COCKS, JOSIAH C	
			ART UNIT	PAPER NUMBER
			3749	

DATE MAILED: 10/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/049,492	Applicant(s) SUDO ET AL.	
	Examiner Josiah Cocks	Art Unit 3749	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on RCE filed 10/1/2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/1/2004 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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4. Claims 1, 3, 4, 6, and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Tanaka et al.* (US # 5,441,403).

Tanaka et al. disclose in Figures 1-12 a combustion method substantially as described in applicant's claims 1, 3, 4, 6, and 8-10, including directing air into an air throat (9) that has a plurality of air inlet openings (11) that cause air flows to collide with one another and are then directed to an outlet that is rectangular (i.e. a cross section having a larger specific surface area than a circular outlet) (see Fig. 9). *Tanaka et al.* also disclose a plurality of fuel outlets (4) forming fuel jet flows that surround the air flows are arranged to collide with the central air flows and form a flat flame shape (see col. 3, lines 11-19 and col. 6, lines 13-21). *Tanaka et al.* describes the primary flame formed as a "vortex-like flow" and a "flame vortex effect" which is regarded by the examiner as the recited turbulent of applicant's claims (see col. 9, lines 11-16). As shown in Fig. 10 of *Tanaka et al.*, the secondary fuel stream (F2) ejected from nozzles (4) first collides with primary flame (B1) but then proceeds to fully collide with the air stream (A) to mix and then the air and fuel are fully combusted to form secondary flame (B2) (see col. 5, lines 42-48). This collision of the fuel (F2) with the air stream (A) is considered to be meet the "entirely collide" language and considered to necessarily "rapidly mix" to form the secondary flame (B2).

In regard to the claim 1 selecting a furnace temperature of not less than 800 °C is simply a matter of operational choice. The furnace of *Tanaka et al.* would be capable of operating at temperatures above 800 °C.

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In regard to claim 9, *Tanaka et al.* teach that it is understood in the art at air to fuel ratios may be adjusted as desired (see col. 4, lines 54-59). To have selected a specific quantity of air or fuel is regarded as simply a matter of engineering choice and is not regarded as patentably distinct.

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Tanaka et al.* as applied to claim 1 above and further in view of *Gitman* (US # 4,453,913).

Tanaka et al. discloses all the limitations of claim 2 except that the combustion air is pre-heated by combustion exhaust gas.

Gitman discloses a burner in the same field of endeavor as *Tanaka et al.* wherein the burner of *Gitman* is a recuperative burner with regenerative medium that pre-heats combustion air by exposure to exhaust gas heat (see abstract and col. 5, lines 28-40).

Therefore, in regard to claim 2, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the method and burner of *Tanaka et al.* to incorporate the preheating of *Gitman* as this preheating desirably contributes to minimizing NO_x formation and increasing flame luminosity (see *Gitman*, col. 2, lines 6-22).

6. Claims 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Tanaka et al.* as applied to claim 1 above, and further in view of *Reed* (US # 3,202,203).

Tanaka et al. teach all the limitations of claims 17, 19, and 20 except possibly that the fuel jet flows collide with each other before coming into contact with the air jet flow.

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Reed teaches a burner in the same field of endeavor as *Tanaka et al.* wherein the burner of *Reed* includes multiple fuel nozzles (42, 43, 46, and 47) forming multiple fuel flows wherein the ports are arranged such that the fuel flows are arranged and angles collide as the leave the flows exit the fuel ports (see Fig. 5, and col. 4, lines 10-25).

Therefore, in regard to claims 5 and 7, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the method and burner of *Tanaka et al.* to incorporate the fuel port arrangement and colliding fuel flows of *Reed* as the colliding fuel flows cause flattening of the fuel streams as they issue from the fuel ports (see *Reed*, col. 4, lines 18-20) and provide adequate heat and stable combustion (see *Reed*, col. 1, lines 56-67).

7. Claims 11, 12, 16, 18, and 24-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Tanaka et al.* (US # 5,441,403).

Tanaka et al. disclose in Figures 1-12 a combustion furnace having a burner substantially as described in applicant's claims 11, 12, 16, 18, and 24-28, including directing air into an air throat (9) that has a plurality of air inlet openings (11) that cause air flows to collide with one another and are then directed to an outlet that is rectangular (i.e. a cross section having a larger specific surface area than a circular outlet) (see Fig. 9). *Tanaka et al.* also disclose a plurality of fuel outlets (4) forming fuel jet flows that surround the air flows are arranged to collide with the central air flows and form a flat flame shape (see col. 3, lines 11-19 and col. 6, lines 13-21). As shown in Fig. 10 of *Tanaka et al.*, the secondary fuel stream (F2) ejected from nozzles (4) first collides with primary flame (B1) but then proceeds to fully collide with the air stream (A) to mix and then the air and fuel are fully combusted to form secondary flame (B2) (see col. 5, lines 42-

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48). This collision of the fuel (F2) with the air stream (A) is considered to be meet the “entirely collide” language and considered to necessarily “rapidly mix” to form the secondary flame (B2). Alternatively, the examiner notes that the fuel nozzles (4) are adjustable and may be arranged to injected fuel into throat (19) at any desired angle (see col. 6, lines 20-24). Therefore, in regard to the apparatus claims, even if the air and fuel collision shown in Fig. 10 is not properly considered to meet the “entirely collide” language, the burner of Tanaka et al. would be capable of directing the fuel to collide with the air stream. The following is an excerpt from the MPEP § 2114 to support this assertion:

APPARATUS CLAIMS MUST BE STRUCTU-RALLY DISTINGUISHABLE FROM THE PRIOR ART

> While features of an apparatus may be recited either structurally or functionally, claims< directed to >an< apparatus must be distinguished from the prior art in terms of structure rather than function. >In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997) (The absence of a disclosure in a prior art reference relating to function did not defeat the Board’s finding of anticipation of claimed apparatus because the limitations at issue were found to be inherent in the prior art reference); see also In re Swinehart, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971);< In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). “[A]pparatus claims cover what a device is, not what a device does.” Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original).

In regard to the claim 11, selecting a furnace temperature of not less than 800 °C is simply a matter of operational choice. The furnace of Tanaka et al. would be capable of operating at temperatures above 800 °C.

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In regard to claims 10, 24, and 25, *Tanaka et al.* teach that it is understood in the art at air to fuel ratios may be adjusted as desired (see col. 4, lines 54-59). To have selected a specific quantity of air or fuel is regarded as simply a matter of engineering choice and is not regarded as patentably distinct.

In regard to claims 26 and 27, as noted above, *Tanaka et al.* discloses an arrangement of fuel and air nozzles that direct fuel and air to collide and form a flat flame in substantially the same manner as described by applicant. *Tanaka et al.* further shows in Fig. 10 a ratio of the diameter of the burner throat (19) to the vertical distance between nozzles (4) to be within the ranges recited in claims 26 and 27. As previously noted, *Tanaka et al.* also notes that the fuel nozzles (4) may be adjusted to a desired injection angle (α_2) (see col. 6, lines 20-24). Therefore, to have selected a specific ratio of throat diameter to an intersection of a fuel injection axis would be simply a matter of optimizing the injection angle (α_2) obtainable through routine experimentation and is not regarded as patentably distinct. (See MPEP § 2144.05(II)(A)).

8. Claims 17, 19, and 20 rejected under 35 U.S.C. 103(a) as being unpatentable over *Tanaka et al.* as applied to claim 11 above, and further in view of *Reed* (US # 3,202,203).

Tanaka et al. teach all the limitations of claims 17, 19, and 20 except possibly that the fuel jet flows collide with each other before coming into contact with the air jet flow.

Reed teaches a burner in the same field of endeavor as *Tanaka et al.* wherein the burner of *Reed* includes multiple fuel nozzles (42, 43, 46, and 47) forming multiple fuel flows wherein the ports are arranged such that the fuel flows are arranged and angles collide as the leave the flows exit the fuel ports (see Fig. 5, and col. 4, lines 10-25).

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Therefore, in regard to claims 17, 19, and 20, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the method and burner of *Tanaka et al.* to incorporate the fuel port arrangement and colliding fuel flows of *Reed* as the colliding fuel flows cause flattening of the fuel streams as they issue from the fuel ports (see *Reed*, col. 4, lines 18-20) and provide adequate heat and stable combustion (see *Reed*, col. 1, lines 56-67).

9. Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Tanaka et al.* as applied to claim 11 above, and further in view of *Yap* (US # 5,360,171).

Tanaka et al. teach all the limitations of claims 13-15 except possibly that the air throat is divided into a plurality of small holes that are arranged in a line and not independent from one another.

Yap teaches a burner in the same field of endeavor as *Tanaka et al.* wherein the burner of *Yap* includes a rectangular air outlet (92 or 94) that is broken up into non-independent exit holes by means of several vanes (96 or 98) and arranged in a line (see Fig. 6).

Therefore, in regard to claims 13-15, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the burner of *Tanaka et al.* to incorporate the multiple oxidant outlet holes of *Yap* as this arrangement allows for combustion staging that lowers NO_x formation (see *Yap*, col. 2, lines 53-61).

10. Claims 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Tanaka et al.* as applied to claim 11 above, and further in view of *Mitani et al.* (US # 6,036,476).

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Tanaka et al. teach all the limitations of claims 21-23 except for a ceramic honeycomb regenerative medium and flow switching means for alternately leading combustion exhaust gas and combustion air to the regenerative medium.

Mitani et al. teach a burner in the same field of endeavor as *Tanaka et al.* wherein the burner of *Mitani et al.* includes a regenerative medium (3) made of ceramic (see col. 5, lines 1-3) and switching means (21) for switching air supply and exhaust gas (see col. 9, lines 37-45 and Fig. 19).

Therefore, in regard to claims 21-23, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the burner of *Tanaka et al.* to incorporate the regenerative medium and switching means of *Mitani et al.* as these structures desirably aid in reducing the generation of NO_x (see *Mitani et al.*, col. 8, lines 8-24).

Response to Arguments

11. Applicant's arguments filed 8/20/2004 and entered with the filing of the RCE on 10/1/2004 have been fully considered but they are not persuasive. As noted above, the examiner considers that as shown in Fig. 10 of *Tanaka et al.* the fuel from nozzles (4) entirely collides with the air flow (A) downstream of the injection opening of the air throat. The air stream (A) and fuel flow (F2) from the nozzles mix such that the air and fuel are fully burned (see *Tanaka et al.*, col. 5, lines 42-47). Applicant's claims are not considered to distinguish over the prior art.

Conclusion

12. This action is made non-final. A THREE month shortened statutory period for reply has been set. Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) months from the mailing date of this communication.

13. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://portal.uspto.gov/external/portal/pair>. Any questions on access to the Private PAIR system should be directed to the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).

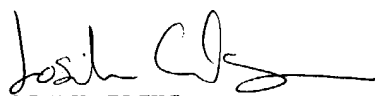
14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Josiah Cocks whose telephone number is (703) 305-0450. The examiner can normally be reached on weekdays from 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ira Lazarus, can be reached at (703) 308-1935. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0861.

jcc
October 14, 2004


JOSIAH COCKS
PRIMARY EXAMINER
ART UNIT 3749